

Nazi-era atrocities committed in the name of science: Historians are redoubling their efforts to document these activities.

Markl's historic overture came here at a symposium on human experimentation sponsored by the Max Planck presidential commission that is investigating the KWG's activities from 1933 to '45. At the opening ceremony at the Fritz Haber Institute in Berlin—a former KWG center where poison-gas research was once conducted—Markl offered eight survivors of concentration-camp experiments “the deepest regret, compassion, and shame at the fact that crimes of this sort were committed, promoted, and not prevented within the ranks of German scientists.” Markl stated that “there is scientific evidence proving beyond the shadow of a doubt that directors and employees at Kaiser Wilhelm Institutes co-masterminded and sometimes even actively participated in the crimes of the Nazi regime. ... The Max Planck Society, as the Kaiser Wilhelm Society's ‘heir,’ must face up to these historical facts and its moral responsibility.”

Markl's admission was followed by emotional speeches by two victims of Nazi physician Josef Mengele's infamous “twins” experiments at the Auschwitz-Birkenau death camp. Of an estimated 1500 sets of twins in Mengele's experiments—during which he would inject one twin with a pathogen or toxic substance and use the other as a control—fewer than 200 individuals survived the war and only about 80 are alive today. “We were used as human guinea pigs,” said Eva Mozes Kor of Terre Haute, Indiana, who barely survived Mengele's abuses along with her twin sister, Miriam. Kor, founder of C.A.N.D.L.E.S., an organization of twins survivors, said she was willing to forgive even her torturers. But warning that “forgiveness erases memory,” Jona Laks, an Israeli survivor who chairs the Organization of Mengele Twins, asserted that some scientists might use such clemency to forget the past. “The deeds of those who did this research cannot be forgiven,” Laks insisted. “We have no ‘power of attorney’ to forgive in the name

of the exterminated victims.”

Just down the block from the conference venue is the building that once housed one of the Nazi regime's most notorious betrayers of scientific ethics: the KWG Institute for Anthropology, Human Genetics, and Eugenics. Mengele did not work for the KWG, but he had earned his Ph.D. under the institute's director, Otmar von Verschuer, who later arranged for Mengele to send blood samples from Auschwitz victims in an unsuccessful bid to find race-specific, disease-fighting proteins (*Science*, 2 June 2000, p. 1576). In addition to Verschuer's institute, Markl said,



**“For way too long,
many questions
were not asked ...
many connections
remained uninvestigated
or only dealt
with by outsiders.”**

—Hubert Markl

abuses were the most blatant at the Institute for Brain Research in Berlin-Buch and the German Research Institute for Psychiatry in Munich, both of which exploited Nazi pogroms to obtain the brains of mentally ill or brain-damaged people for analysis.

Molecular geneticist Benno Müller-Hill, who first detailed the Verschuer-Mengele link in his 1984 book *Murderous Science*, told *Science* that he thought Markl's apology “had exactly the right tone. It's a shame that speech wasn't given 20 years ago.” Markl concedes that the apology and the ongoing KWG investigation have come late. “For way too long, many questions were not asked. For way too long, many connections remained uninvestigated or only dealt with by outsiders. And for way

too long, many documents lay in the archives, inaccessible either because they remained classified, or because people were all too glad to disregard them,” he said. But Markl defended the apology's timing, explaining that it followed the historical commission's interim report last fall that assembled the known evidence of KWG biomedical abuses. He also pointed out that Max Planck had previously acknowledged nefarious research at the three institutes.

“It's good to finally get this into the open,” says Auschwitz survivor Vera Kriegel. She and her twin sister Olga were victims of experiments in which Mengele injected an unknown fluid into their spines. “The experiments affected our bodies and our souls,” complains Kriegel, who wants to know more

ScienceScope

Clinical Elite Physicians will soon be given a selective invitation to join the ranks of the researchers employed by the Howard Hughes Medical Institute (HHMI) in Chevy Chase, Maryland—but only a few. In a new departure, the \$13 billion institute plans to announce this week that it will spend up to \$100 million to add five to 10 physician-scientists to its staff of 340 investigators. Only a handful of the current staff are doing patient-oriented research, according to HHMI. But the new program will make “a concerted effort to bridge the gap between molecular science and the alleviation of pain and suffering,” says HHMI chief Tom Cech. HHMI will send letters to 119 institutions seeking nominations later this year, with applications due by 1 October. The winners will be announced next year.

Euro Advice The leaders of Europe's science academies will form a new Science Advisory Council to provide independent expert advice to policy-makers. The new council's chair, Swedish cell biologist Uno Lindberg, says that the London-based council plans to call on “Europe's best research scientists” for reports on issues “with a scientific component.”

The council will soon poll European policy-makers “to define a list of potential projects,” says Lindberg, the foreign secretary of the Royal Swedish Academy of Sciences, which hosted a meeting this week in Stockholm. “We also plan to take our own initiative in defining some issues.”

Peter Collins, who directs science policy for The Royal Society and is currently the council's sole staffer, says it will be much leaner than the National Research Council, which conducts studies for the U.S. national academies. The group plans to meet in September to discuss possible projects and how to bring Germany—which has no national academy—into the fold.

Grafting Four of east Germany's top plant research institutes are banding together to form PlantMetaNet, a network to foster collaboration, coordinate purchases of big-ticket equipment, and attract top postdocs. The four centers—the Max Planck Institute (MPI) for Molecular Plant Physiology in Potsdam, the MPI for Chemical Ecology in Jena, the Institute for Plant Genetics in Gatersleben, and the Institute for Plant Biochemistry in Halle—plan to meet next month in Wittenberg to discuss cooperative research on plant metabolism and defense mechanisms.



are testing new programs with names like JAZZ, Arachne, and Euler. U.S. Human Genome Project leader Francis Collins predicts that by "late summer" everyone will have access to such souped-up computer tools. If so, by September, genome assembly could be a whole new ball game.

—ELIOT MARSHALL

NEURODEGENERATIVE DISEASE

Using the Fruit Fly to Model Tau Malfunction

In the slow-motion train wreck that is Alzheimer's disease, different types of debris pile up inside and outside dying brain neurons. But despite decades of research, researchers still don't know exactly what kills the cells.

Most attention has focused on defects in a protein called β amyloid, which clumps up into plaques outside neurons and seems to throw the switch that first steers the cells off course. But inside neurons, another protein called tau may act as an accomplice. In Alzheimer's brains, tau forms part of abnormal intracellular structures called tangles, although it's not clear whether tangle formation is the cause or result of the neuronal degeneration. It is clear, however, that other human dementias can be caused by tau defects even in the absence of plaques, indicating that here at least the tau defect is primary. Now a new fruit fly model may help reveal just how defective tau sends healthy brain cells veering off track.

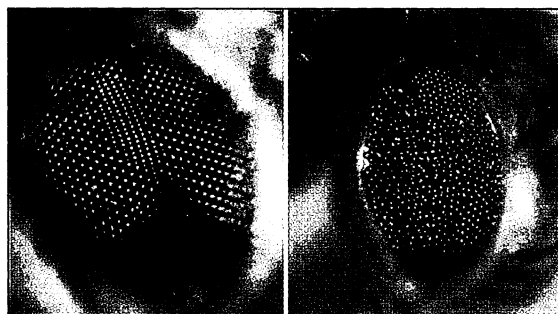
In work published online by *Science* on 14 June (www.sciencexpress.org), Mel Feany of Harvard Medical School in Boston and her colleagues show that fruit flies producing human tau undergo brain neuron degeneration, although, in a surprising finding, the dying fly neurons do not contain tangles. It's "very elegant, nicely done work," says Zaven Khachaturian, senior scientific adviser to the Alzheimer's Association. "It could change the focus of research for developing treatments [for dementias]."

No mutations in the *tau* gene have been linked to Alzheimer's, but in 1998, researchers discovered that *tau* mutations do cause a group of dementias with the unwieldy name hereditary frontotemporal dementia and parkinsonism linked to chromosome 17 (FTDP-17). To find out how tau damages neurons, Feany's team introduced either the normal human *tau* gene or a mutant version that causes FTDP-17 into fruit flies. Flies with either gene died younger than controls, but the effect was most pronounced in

those with the mutant gene, the researchers report. The results suggest that the normal and mutant tau had each taken its toll.

The researchers then watched what happened to the nervous systems of both types of transgenic flies as they aged. Brain cells in day-old flies were fine, but neurons in doddering 30-day-old flies had disintegrating cell nuclei and other organelles. "We saw them falling apart," Feany says. The human tau proteins especially damaged neurons that communicate using the neurotransmitter acetylcholine—a group of cells that are also hit heavily in Alzheimer's disease.

Together, the results suggest that the fruit flies with human tau mimic the tau-induced damage seen in Alzheimer's disease, FTDP-17, and other dementias in which tau goes awry, Feany says. But the



Rough and ready. Because fruit flies expressing mutant tau have smaller, rougher eyes (right) than is normal (left), they should help researchers identify new dementia-related genes.

absence of tangles in the transgenic flies was puzzling. Because the brains of FTDP-17 patients contain copious tangles, some researchers speculate that the cells are killed by tangles that gum up their internal works, although others suggest that soluble forms of defective tau proteins can kill without forming tangles. The flies with the mutant tau protein support the latter view, Feany says: Even though no tangles formed in their neurons, the cells died anyway.

Some experts caution, however, that the lack of tangles might mean that flies aren't a good model of human dementias. "The worry is that cells are dying by a different mechanism than neurons do when they make tangles in Alzheimer's disease," says neuroscientist John Hardy of the Mayo Clinic in Jacksonville, Florida.

Others don't see a problem. "I'm not bothered one bit that [they] didn't find tangles," says neuropathologist John Trojanowski of the University of Pennsylvania School of Medicine in Philadelphia, one of the researchers who linked *tau* mutations to FTDP-17. Because the protein normally stabilizes microtubules, which help ferry life-sustaining molecules to nerve endings, he suggests that defective but soluble tau might kill neurons by crippling their transport system. Others say

ScienceScope

Cracking the Code A team of cryptographers is suing the Recording Industry Association of America (RIAA) over the right to present a paper at a conference. In a federal court suit filed last week, Princeton University computer scientist Ed Felten and colleagues claim that a provision of the 1998 Digital Millennium Copyright Act (DMCA) unconstitutionally limits researchers from sharing information.

Last year, Felten's team claimed to have cracked a digital "watermarking" scheme for music. But earlier this year the researchers dropped plans to describe their feat at a conference after feeling threatened by the RIAA, which could have sued under the DMCA (*Science*, 4 May, p. 826). The suit seeks to clarify their right to present the work in public.

The lawsuit is "inexplicable," says RIAA general counsel Cary Sherman, because the group doesn't intend to sue the team. But Gino Scarselli, a lawyer for the cryptographers, says that the court needs to "look at the long-term effects of the [DMCA]. ... At its very core, it is a constraint on publication."

Partnership Perils A new report outlining best practices for university-industry partnerships is ruffling some feathers. The Business-Higher Education Forum last week released "Working Together, Creating Knowledge: The University-Industry Research Collaboration Initiative," which uses case studies to highlight the promise and peril of linking scholars and corporate dollars.

The report—produced by a panel led by Pfizer CEO Hank McKinnell and Nils Hasselmo, president of the Association of American Universities—highlights what McKinnell calls "the best of times and the worst of times." In particular, he says that Monsanto's collaboration with Washington University in St. Louis is a good model, whereas Novartis's arrangement with the University of California, Berkeley, raises some red flags.

McKinnell's comments weren't welcome at Berkeley. "It is understandable why the CEO of a large pharmaceutical company would strongly prefer the Washington University-Monsanto agreement," says Berkeley economist Gordon Rausser. "Under this agreement, Monsanto controls the research agenda. ... Such terms would not be acceptable [at Berkeley]." The Berkeley deal, he noted, conforms to the report's recommendations.

Contributors: Eliot Marshall, Robert Koenig, Charles Seife, David Malakoff